

1 1. A method for communicating pulse coded information between  
2 low power transceivers which comprises:  
3 spectrally spreading a carrier; and  
4 modulating the spectrally spread carrier with a data pulse  
5 code waveform comprising information to be transmitted, to form a  
6 modulated spectrally spread (MSS) signal.

1 ~~2. The method of Claim 1 wherein said spectrally spreading a~~  
2 ~~carrier comprises phase shift keying (PSK) the carrier with a~~  
3 ~~first direct sequence pseudo-random pulse code waveform.~~

3. The method of Claim 2 wherein said phase shift keying  
comprises binary phase shift keying (BPSK).

4. The method of Claim 1 wherein said spectrally spreading a  
carrier comprises generating a frequency hopping signal.

5. The method of Claim 1 wherein said spectrally spreading a  
carrier comprises generating a time hopping signal.

1 6. The method of Claim 1 wherein said spectrally spreading a  
2 carrier comprises generating a time/frequency hopping signal.

1 7. The method of Claim 1 wherein said spectrally spreading a  
2 carrier comprises generating any FM signal where its modulation  
3 bandwidth is greater than said data pulse code waveform's  
4 bandwidth.

1 8. ~~The method of Claim 1 wherein said spectrally spreading a~~  
2 carrier comprises generating an FM chirping signal.

1 9. The method of Claim 1 which further comprises modulating  
2 said data pulse code waveform with a second direct sequence  
3 pseudo-random pulse code waveform prior to modulating the  
4 spectrally spread carrier.

1 10. The method of Claim 1 wherein said modulating comprises  
2 pulse amplitude modulating and said MSS signal comprises a pulse  
3 amplitude modulated spectrally spread signal.

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1 11. The method of Claim 10 which further comprises modulating a  
2 second direct sequence pseudo-random pulse code waveform with  
3 said MSS waveform.

1 12. The method of Claim 11 which further comprises:

transmitting said MSS signal,

receiving said MSS signal,

extracting said data pulse code waveform from said MSS  
signal.

1 13. The method of Claim 12 wherein said extracting comprises:

removing said spectrally spread carrier from said MSS

~~signal resulting in a received pulse code waveform comprising:~~

~~said data pulse code waveform and~~

5 ~~said second direct sequence pseudo-random pulse~~  
6 code waveform;  
7 generating a third direct sequence pseudo-random pulse  
8 code waveform substantially similar to and in synchronization  
9 with said second direct sequence waveform;  
10 gating said received pulse code waveform with said  
11 third direct sequence waveform;  
12 filtering the output of said gating step resulting in  
13 an average value representing one of two possible logical values  
14 for said data pulse code waveform.

14. The method of Claim 13 wherein said generating a third  
direct sequence psuedo-random pulse code waveform (DSPPCW)  
comprises:

transmitting a preamble portion of said MSS signal  
wherein said data pulse code waveform is non-transitioning,  
producing a clock waveform in-sync with said second  
DSPPCW,  
performing a sequential correlation comparison between  
said received pulse code waveform and each of a plurality of  
candidate waveforms,  
recording the results of each comparison,  
chosing the candidate with a highest correlation value  
as said third DSPPCW.

15. The method of Claim 14 which comprises:

~~using said clock waveform as a return carrier frequency~~

3. source.

1 ~~16. An apparatus for identifying and tracking the whereabouts of~~  
2 ~~moving bodies around a defined area which comprises:~~

3 ~~an interrogating station including a first transceiver;~~  
4 ~~said first transceiver comprising:~~

5 ~~means for generating a carrier,~~

6 ~~means for spectrally spreading said carrier,~~

7 ~~means for generating a data pulse code waveform, and~~

8 ~~means for modulating said carrier with said data~~  
9 ~~waveform resulting in a modulated carrier waveform;~~

10 ~~at least one tag associated with one of said bodies,~~

11 ~~said tag including a second transceiver,~~

12 ~~said second transceiver comprising:~~

13 ~~means for extracting said data pulse code~~  
14 ~~waveform from said modulated carrier waveform.~~

15 17. The apparatus in Claim 16 wherein said means for spectrally  
16 spreading said carrier comprises a means for phase shift keying  
17 (PSK) said carrier with a first direct sequence pseudo-random  
18 pulse code waveform.

1 18. The apparatus of Claim 16 wherein said means for phase shift  
2 keying comprises binary phase shift keying (BPSK).

1 19. The apparatus of Claim 16 wherein said means for spectrally  
2 spreading comprises a means for generating a frequency hopping

3 ~~signal.~~

1 20. The apparatus of Claim 16 wherein said means for spectrally  
2 spreading comprises a means for generating a time hopping signal.

1 21. The apparatus of Claim 16 wherein said means for spectrally  
2 spreading comprises a means for generating a time/frequency  
3 hopping signal.

1 22. The apparatus of Claim 16 wherein said means for spectrally  
2 spreading comprises a means for generating any FM signal where  
3 its modulation bandwidth is greater than said data waveform's  
4 bandwidth.

1 23. The apparatus of Claim 16 wherein said means for spectrally  
2 spreading comprises a means for generating an FM chirping signal.

1 24. The apparatus of Claim 16 which further comprises means for  
2 modulating said data waveform with a second direct sequence  
3 pseudo-random pulse code waveform.

1 25. The apparatus of Claim 24 wherein said means for modulating  
2 said data waveform comprises a means for multiplying said data  
3 waveform with said second direct sequence waveform.

1 26. The apparatus of Claim 24 wherein said means for extracting  
2 comprises:

3. ~~means for removing said spectrally spread carrier from~~  
4 said modulated carrier waveform resulting in a received pulse  
5 code waveform comprising:

6       said data pulse code waveform and  
7       said second direct sequence pseudo-random pulse  
8 code waveform;

9       means for generating a third direct sequence pseudo-  
10 random pulse code waveform substantially similar to and in  
11 synchronization with said second direct sequence waveform;

12       means for gating said received pulse code waveform with  
13 said third direct sequence waveform;

14       means for filtering the output of said means for gating  
15 resulting in an average value representing one of two possible  
16 logical values for said data pulse code waveform.

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27. The apparatus of Claim 26 wherein said means for generating  
a third direct sequence psuedo-random pulse code waveform  
(DSPPCW) comprises:

28       means for transmitting a preamble portion of said MSS signal  
29 wherein said data pulse code waveform is non-transitioning,

30       means for producing a clock waveform in-sync with said  
31 second DSPPCW,

32       means for performing a sequential correlation comparison  
33 between said received pulse code waveform and each of a plurality  
34 of candidate waveforms,

35       means for recording the results of each comparison,

36       ~~means for choosing the candidate with a highest correlation~~

13 ~~value as said third DSPPCW.~~

1 28. ~~The apparatus of Claim 14 wherein said clock waveform~~  
2 ~~provides the source of a return carrier frequency.~~

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